

RECEIVED  
CENTRAL FAX CENTER

APR 21 2005

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: Hazen, *et al.*

Docket No.: IMET0040

Serial No: 09/664,973

Filed: September 18, 2000

U.S. Patent Number: 6,864,978

Date Issued: March 8, 2005

Examiner: D. McCrosky

Art Unit: 2877

Title: METHOD AND CHARACTERIZING SPECTROMETER INSTRUMENTS AND PROVIDING CALIBRATION MODELS TO COMPENSATE FOR INSTRUMENT VARIATION

April 21, 2005

Assistant Commissioner for Patents  
Mail Stop Certificate of Corrections  
P.O. Box 1450  
Alexandria, VA 22313-1450

**Request for Certificate of Correction in Patent under 35 USC §254**

The enclosed Certificate of Correction (PTO Form 1050) for the above-identified patent is submitted under Rule 322.

The correction requested involves mistakes made by the Patent Office. The Office has misspelled under Claim 27 the word "clusters" as "dusters". Also under Claim 27, the word "instruments" was incorrectly capitalized as "Instruments." Please correct Claim 27 to read as follows:

27. A method of characterizing spectrometer instruments according to instrument variation, comprising the steps of:

collecting spectra using at least one optical spectrometer instrument; and

classifying said spectra into predefined clusters on the basis of extracted spectral features; and

providing calibration models for each of said predefined clusters, wherein said calibration models model instrumental variation.

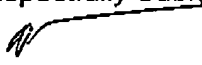
The patentee is entitled to correction of good-faith transcription of a clerical error where "the correction does not involve such changes in the patent as would constitute new matter or would require reexamination." 35 U.S.C. § 255. Therefore, no new matter is provided with this Certificate of Correction.

The enclosed Certificate of Correction (PTO Form 1050) for the above-identified patent is submitted under Rule 323, in duplicate, with at least one copy being suitable for printing.

Please send the Certificate to the undersigned at the address shown below.

The Commissioner is hereby authorized to charge the fee of \$100.00 to Deposit Account 07-1445 (Order No. IMET0040). This paper is provided in duplicate.

Respectfully Submitted,

  
Michael A. Glenn  
Reg. No. 30,176

Customer No. 22862

RECEIVED  
CENTRAL FAX CENTER

**COPY**

APR 21 2005

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: Hazen, *et al.*

Docket No.: IMET0040

Serial No: 09/664,973

Filed: September 18, 2000

U.S. Patent Number: 6,864,978

Date Issued: March 8, 2005

Examiner: D. McCrosky

Art Unit: 2877

Title: METHOD AND CHARACTERIZING SPECTROMETER INSTRUMENTS AND PROVIDING CALIBRATION MODELS TO COMPENSATE FOR INSTRUMENT VARIATION

April 21, 2005

Assistant Commissioner for Patents  
Mail Stop Certificate of Corrections  
P.O. Box 1450  
Alexandria, VA 22313-1450

**Request for Certificate of Correction in Patent under 35 USC §254**

The enclosed Certificate of Correction (PTO Form 1050) for the above-identified patent is submitted under Rule 322.

The correction requested involves mistakes made by the Patent Office. The Office has misspelled under Claim 27 the word "clusters" as "dusters". Also under Claim 27, the word "instruments" was incorrectly capitalized as "Instruments." Please correct Claim 27 to read as follows:

27. A method of characterizing spectrometer instruments according to instrument variation, comprising the steps of:

collecting spectra using at least one optical spectrometer instrument; and

classifying said spectra into predefined clusters on the basis of extracted spectral features; and

providing calibration models for each of said predefined clusters, wherein said calibration models model instrumental variation.

The patentee is entitled to correction of good-faith transcription of a clerical error where "the correction does not involve such changes in the patent as would constitute new matter or would require reexamination." 35 U.S.C. § 255. Therefore, no new matter is provided with this Certificate of Correction.

**COPY**

The enclosed Certificate of Correction (PTO Form 1050) for the above-identified patent is submitted under Rule 323, in duplicate, with at least one copy being suitable for printing.

Please send the Certificate to the undersigned at the address shown below.

The Commissioner is hereby authorized to charge the fee of \$100.00 to Deposit Account 07-1445 (Order No. IMET0040). This paper is provided in duplicate.

Respectfully Submitted,



Michael A. Glenn  
Reg. No. 30,176

Customer No. 22862

## US 6,864,978 B1

11

is calculated for each remaining cluster, and wherein a transform modifies said slave calibration model to said master calibration model in accordance with principal features defining each of said classes.

22. The method of claim 21, wherein said transferring step comprises the steps of:

transferring said master calibration model to a first slave calibration model;

transferring said first slave calibration model to a second slave calibration model;

and repeating said transfer from one slave calibration model to another slave calibration model, until a calibration has been provided for each of said predefined clusters;

wherein a transform modifies said transferred calibration models in accordance with principal features defining each of said clusters.

23. The method of claim 18, wherein a different calibration model is developed for each cluster, and wherein said calibration models are developed from a set of exemplar spectra, with reference values and pre-assigned cluster definitions.

24. The method of claim 23, wherein a spectrum is assigned to one of many of said predefined clusters for which a calibration model has been developed.

25. The method of claim 1, further comprising the steps of:

providing new spectral measurements;

comparing said new spectral measurements to each of said pre-defined clusters according to extracted spectral features;

reporting those measurements as outliers for which a matching cluster is not found.

26. A method of developing calibration models for spectral analysis comprising the steps of:

defining clusters from an exemplar data set of spectral measurements, wherein said clusters exhibit a high degree of internal similarity;

mapping said clusters to one another, wherein principal features distinguishing clusters from one another are determined;

calculating a calibration model for a first of said clusters, said calibration model comprising a master calibration;

transferring said master calibration to at least one slave calibration, wherein a slave calibration comprises a calibration derived by applying a transform to slave spectra such that the master calibration now models the difference between the master cluster and another cluster corresponding to said slave spectra.

27. A method of characterizing spectrometer instruments according to instrument variation, comprising the steps of:

collecting spectra using at least one optical spectrometer instrument; and

classifying said spectra into predefined clusters on the basis of extracted spectral features; and

providing calibration models for each of said predefined clusters, wherein said calibration models model instrumental variation.

28. A method of characterizing spectrometer instruments according to instrument variation, comprising the steps of: collecting spectra using at least one spectrometer instrument; and

classifying said spectra into predefined clusters on the basis of extracted spectral features; and

12

providing calibration models for each of said predefined clusters, wherein said calibration model is applied to a new spectral measurement.

29. A method of characterizing spectrometer instruments according to instrument variation, comprising the steps of: collecting spectra using at least one spectrometer instrument; and

classifying said spectra into predefined clusters on the basis of extracted spectral features; and

providing calibration models for each of said predefined clusters, wherein said calibration models model said instrument variation; and

wherein said at least one spectrometer instrument is not a mass spectrometer.

30. A method of characterizing spectrometer instruments according to instrument variation, comprising the steps of: collecting at least one spectrum using at least one spectrometer instrument; and

classifying said spectrometer instrument into predefined clusters on the basis of extracted spectral features; and providing calibration models for each of said predefined clusters.

31. The method of claim 30, wherein said calibration models model instrument variation.

32. The method of claim 3, wherein said instrument variation comprises any of:

wavelength shifts;

nonlinear wavelength shifts;

wavelength expansions;

wavelength contractions;

nonlinear wavelength expansions;

source intensity drifts;

blackbody profile changes;

bandwidth changes;

resolution changes;

baseline deviations;

changes over time;

temperature effects;

detector response;

differences in optical components;

variation related to mounting of references;

differences in the optical interface to the sample;

linearity; and

detector cut-off.

33. The method of claim 30, wherein said standard spectra are measured on a plurality of spectrometer instruments.

34. The method of claim 30, wherein said standard spectra are measured on a single spectrometer instrument at successive time intervals.

35. The method of claim 30, wherein said classifying step comprises the steps of: extracting features; and classifying said features according to a classification model and decision rule.

36. The method of claim 35, wherein said feature extraction step comprises any mathematical transformation that enhances a particular aspect or quality of data that is useful for interpretation.

37. The method of claim 35, wherein said classification model comprises means for determining a set of similarity measures with predefined classes.

38. The method of claim 35, wherein said decision rule comprises means for assigning class membership on the basis of a set of measures calculated by a decision engine.

Please  
correct  
instruments  
clusters

Supplemental Amendment faxed on 2/12/2004

**COPY**

25. (Allowed) The method of Claim 1, further comprising the steps of:  
providing new spectral measurements;  
comparing said new spectral measurements to each of said pre-defined clusters  
5 according to extracted spectral features;  
reporting those measurements as outliers for which a matching cluster is not found.

26. (Allowed) A method of developing calibration models for spectral analysis comprising the steps of:

- 10 defining clusters from an exemplar data set of spectral measurements, wherein said clusters exhibit a high degree of internal similarity;  
mapping said clusters to one another, wherein principal features distinguishing clusters from one another are determined;  
calculating a calibration model for a first of said clusters, said calibration model  
15 comprising a master calibration;  
transferring said master calibration to at least one slave calibration, wherein a slave calibration comprises a calibration derived by applying a transform to slave spectra such that the master calibration now models the difference between the master cluster and another cluster corresponding to said slave spectra.

20 → 27. (Allowed) A method of characterizing spectrometer instruments according to instrument variation, comprising the steps of:

collecting spectra using at least one optical spectrometer instrument; and  
classifying said spectra into predefined clusters on the basis of extracted spectral  
25 features; and  
providing calibration models for each of said predefined clusters, wherein said calibration models model instrumental variation.

28. (Allowed) A method of characterizing spectrometer instruments according to  
30 instrument variation, comprising the steps of:

collecting spectra using at least one spectrometer instrument; and  
classifying said spectra into predefined clusters on the basis of extracted spectral features; and  
providing calibration models for each of said predefined clusters, wherein said  
35 calibration model is applied to a new spectral measurement.

PTO/SB/44 (10-88)

Approved for use through 8/30/99. OMB 0651-0033

Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

(Also Form PTO-1050)

**UNITED STATES PATENT AND TRADEMARK OFFICE  
CERTIFICATE OF CORRECTION**

PATENT NO : 6,864,978

DATED : March 8, 2005

INVENTOR(S) : Hazen, et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Page 11, Claim 27: replace "A method of characterizing spectrometer instruments according to instrument variation, comprising the steps of:

collecting spectra using at least one optical spectrometer instrument; and

classifying said spectra into predefined clusters on the basis of extracted spectral features; and

providing calibration models for each of said predefined clusters, wherein said calibration models model instrumental variation.

with - - - "A method of characterizing spectrometer instruments according to instrument variation, comprising the steps of:

collecting spectra using at least one optical spectrometer instrument; and

classifying said spectra into predefined clusters on the basis of extracted spectral features; and

providing calibration models for each of said predefined clusters, wherein said calibration models model instrumental variation."

MAILING ADDRESS OF SENDER:

Glenn Patent Group  
3475 Edison Way, Suite L  
Menlo Park, CA 94026

PATENT NO. 6,864,978

No. of additional copies



Burden Hour Statement: This form is estimated to take 1.0 hour to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

PTO/SB/44 (10-96)

Approved for use through 6/30/99, OMB 0651-0033

Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1996, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

(Also Form PTO-1050)

**UNITED STATES PATENT AND TRADEMARK OFFICE  
CERTIFICATE OF CORRECTION**

PATENT NO : 6,864,978  
DATED : March 8, 2005  
INVENTOR(S) : Hazen, et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Page 11, Claim 27: replace "A method of characterizing spectrometer instruments according to instrument variation, comprising the steps of:

collecting spectra using at least one optical spectrometer instrument; and

classifying said spectra into predefined clusters on the basis of extracted spectral features; and

providing calibration models for each of said predefined clusters, wherein said calibration models model instrumental variation.

with - - - "A method of characterizing spectrometer instruments according to instrument variation, comprising the steps of:

collecting spectra using at least one optical spectrometer instrument; and

classifying said spectra into predefined clusters on the basis of extracted spectral features; and

providing calibration models for each of said predefined clusters, wherein said calibration models model instrumental variation."

MAILING ADDRESS OF SENDER:

Glenn Patent Group  
3475 Edison Way, Suite L  
Menlo Park, CA 94025

PATENT NO. 6,864,978

No. of additional copies



Burden Hour Statement: This form is estimated to take 1.0 hour to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.



RECEIVED  
CENTRAL FAX CENTER

APR 21 2005

PTO/SB/97 (08-00)  
Approved for use through 10/31/2002. OMB 0851-0031  
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE  
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

### Certificate of Transmission under 37 CFR 1.8

I hereby certify that this correspondence is being facsimile transmitted to the  
United States Patent and Trademark Office

on April 21, 2005  
Date

Attn: Request for Certification of Patent Correction  
Fax: (703) 872-9306  
From: GLENN PATENT GROUP  
Tel: (650) 474-8400  
Fax: (650) 474-8401



Signature

Kristianne Serrano

Typed or printed name of person signing Certificate

Note: Each paper must have its own certificate of transmission, or this certificate must identify  
each submitted paper.

Re: Patent No. 6,864,978  
Atty. Docket No. IMET0040  
TOTAL PAGES (Incl. cover sheet) - 9  
The following documents are enclosed:

- Certificate of Facsimile Transmission (1 page);
- Request for Certificate of Correction in Patent (2 pages, in duplicate); and
- Page 11 of Patent showing requested corrections (1 page);
- Page 7 of Supplemental Amendment faxed on February 12, 2004 (1 page); and
- Certificate of Correction (1 page, in duplicate).

Burden Hour Statement: This form is estimated to take 0.03 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.